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EXAMINER

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14-22, 26, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marisic (2,384,946) in view of Fernholz et al (3,939,199) and optionally further in view of Mielke et al (5,656,195).

Marisic '946 discloses a process of producing hydrogel pellets by continuously contacting within an enclosed mixing chamber such as an injector or nozzle mixer, streams of reactant solutions of such concentration and proportions that no gelation occurs within the mixer, but only at some predetermined time after leaving the mixer, and under such conditions of flow that each stream is completely and uniformly dispersed within and throughout the other at the instant of contact. The resultant colloidal solution is ejected from the mixer through an orifice or orifices of suitable size so as to form globules of the solution which are introduced into a fluid medium where the globules of the colloidal solution set to a gel before they pass out of the medium (note page 2, lines 48-64). Pellets may also be formed by a process analogous to spray drying wherein the gelable solution is sprayed into a drying tower (note page 2, left column, lines 68-72). The fluid medium can be constituted of a gas such as air (note sentence bridging the 2 columns on page 2).

Marisic '946 further disclose that the medium may contain components, which can be dissolved therefrom by the hydrosol (note page 1, left column, lines 17-18).

Marisic '946 discloses that the hydrogel can be produced from a solution of sodium silicate and hydrochloric acid (note Example III).

It would have been obvious to one skilled in the art to select any embodiment among the specifically disclosed embodiments, *Merck & Co. Inc. v. Biocraft Laboratory Inc.* 10 USPQ 1846.

Marisic '946 further discloses that the fluid medium is maintained at a temperature below the boiling point of said sol. After setting is complete, the hydrogen may be washed, base exchanged, heat treated or otherwise processed to obtain the desired physical and chemical characteristics in the final product (note page 2, right column, lines 14-40). The resulting gel possesses open pores free of liquid, this product is considered the same as the claimed aerogel.

Marisic does not specifically disclose the temperature of the process, however, it would have been obvious to optimize these process conditions to obtain the best results. It would also have been obvious to dry the hydrogel to obtain aerogel since aerogel is desired in the art.

For the step of converting the hydrogel to aerogel, in the event that the above heat treating step of Marisic '946 is not sufficient to convert the hydrogel to aerogel, Mielke '195 can be applied as stated below.

Mielke '195 teaches that silica aerogel particles are desired to be used in moldings (note claim 1). Mielke '195 further discloses that silica aerogel can be produced by solvent exchange, and subsequent supercritical drying a silica hydrogel.

Thus, it would have been obvious to one of ordinary skill in the art to convert the hydrogel of Marisic to aerogel because aerogel is desired to be used in moldings as suggested by Mielke '195.

The difference is Marisic 946 does not disclose that the fluid is moving substantially against the direction of gravity.

Fernholz '199 discloses that for a spray-drying process for converting a sol to a gel, in order to avoid damage of the gelled and still soft particles, they can be sprayed in upward inclined direction and collected in a liquid bath (for example water) or they can be conducted in countercurrent flow with a current of air or gas which reduces their impact velocity and simultaneously improves their resistance by drying. In this manner particles of almost any desired size can be produced (note column 2, lines 23-33).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use a current of air or gas in countercurrent flow with the spray of silica sol in the process of Marisic '946, as suggested by Fernholz '199 because such countercurrent flow of air would reduce the silica gels impact velocity and improve their resistance by drying.

For claim 20, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have used both the water bath and the countercurrent flow of air to avoid damage of the gelled and still soft particles, because combining two or more ways as disclosed in Fernholz '199 for the same purpose has been held to be a prima facie case of obviousness, see *In re Kerkhoven*, 205 USPQ 1069.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marisic (2,384,946) in view of Fernholz et al (3,939,199) and Frank et al (5,789,075).

Marisic '946 and Fernholz '199 are applied as stated in the above rejection.

The difference not yet discussed is Marisic '946 does not teach the silylating step.

Frank '075 discloses that the term aerogel encompasses xerogels and cryogels (note column 1, lines 12-24). Frank '075 further discloses that it is known in the art to convert gels into xerogels by modified the gels by silylation in such a way that the gels can be air dried without collapsing (note column 1, lines 54-61).

It would have been obvious to one of ordinary skill in the art to convert the gel of Marisic into an aerogel (i.e., xerogel) by first silylating the gel, as suggested by Frank '075 in order to dry the gel without collapsing the gel structure and because Frank teaches that aerogel is a desired product in the art.

Applicant's arguments filed July 3, 2007 have been fully considered but they are not persuasive.

Applicants argue that Marisic teaches that "it is essential to the formation of a structurally strong pellet that the sol not be mechanically disturbed during the time of setting".

However, Marisic '946 further teaches that evaporation of water in the sol tends to generate steam which not only mechanically disturbs the gel structure during formation but also introduces gas bubbles of large size compared with the size of the pellet and the fluid medium should therefore be maintained at a temperature below the boiling point of the sol until the same has set to firm hydrogel (note page 2, right column, lines 5-13). Thus, the only exemplified "mechanically disturbed" is when the temperature is higher than boiling point of the sol, since Marisic '946 even discloses a

flow against gravity (note Figure 4), the flow itself does not appear to cause the "mechanically disturbs".

Applicants argue that Marisic does not disclose a medium that flows against the direction of gravity.

Fernholz is applied as stated above to teach a medium that flows against the direction of gravity as required by Applicants' claims.

Applicants argue that the medium in Marisic is a water-immiscible liquid heavier than water, with a water layer above.

It should be noted that Marisic discloses that the fluid medium may also be constituted of a gas such as air (note sentence bridging the two columns on page 2).

Applicants argue that Mielke cannot cure the deficiencies of Marisic.

Mielke is only disclose the teach that silica aerogel particles are desirable to be used in molding, not to teach a process in which a lyosol is introduced into an atmosphere which flows substantially against the direction of gravity.

The rejection of claim 27 is also maintained for the same reasons as stated above.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner can normally be reached on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/
Primary Examiner, Art Unit 1793

nmn
June 29, 2008